National Institute of Environmental Health Sciences

The limits and intensity of Plasmodium falciparum transmission: Implications for malaria control and elimination worldwide

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Abstract:

BACKGROUND: The efficient allocation of financial resources for malaria control using appropriate combinations of interventions requires accurate information on the geographic distribution of malaria risk. An evidence-based description of the global range of Plasmodium falciparum malaria and its endemicity has not been assembled in almost 40 y. This paper aims to define the global geographic distribution of P. falciparum malaria in 2007 and to provide a preliminary description of its transmission intensity within this range. METHODS and FINDINGS: The global spatial distribution of P. falciparum malaria was generated using nationally reported case-incidence data, medical intelligence, and biological rules of transmission exclusion, using temperature and aridity limits informed by the bionomics of dominant Anopheles vector species. A total of 4,278 spatially unique cross-sectional survey estimates of P. falciparum parasite rates were assembled. Extractions from a population surface showed that 2.37 billion people lived in areas at any risk of P. falciparum transmission in 2007. Globally, almost 1 billion people lived under unstable, or extremely low, malaria risk. Almost all P. falciparum parasite rates above 50% were reported in Africa in a latitude band consistent with the distribution of Anopheles gambiae s.s. Conditions of low parasite prevalence were also common in Africa, however. Outside of Africa, P. falciparum malaria prevalence is largely hypoendemic (less than 10%), with the median below 5% in the areas surveyed. CONCLUSIONS: This new map is a plausible representation of the current extent of P. falciparum risk and the most contemporary summary of the population at risk of P. falciparum malaria within these limits. For 1 billion people at risk of unstable malaria transmission, elimination is epidemiologically feasible, and large areas of Africa are more amenable to control than appreciated previously. The release of this information in the public domain will help focus future resources for P. falciparum malaria control and elimination.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2253602

Resource Description

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact:

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Malaria

Medical Community Engagement:

resource focus on how the medical community discusses or acts to address health impacts of climate change

A focus of content

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology:

type of model used or methodology development is a focus of resource

Methodology, Outcome Change Prediction

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content